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SEGMENTAL PULMONARY RESECTION FOR BRONCHIECTASIS

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BRONCHIECTASIS is a serious disease, confronting its victim with progressively frequent, prolonged, and disabling periods of illness. Ultimately infectious complications arise in a majority of instances which cause death. In recent years it has been shown that this inevitable course can be interrupted by surgical excision of the affected parts of the lung and that the patient can be restored to normal health. All too often, however, the pulmonary involvement is too widespread to permit successful excision of all unhealthy parts.

The essential pathologic features of the disease have long been recognized. In various parts of the pulmonary tree the bronchi are dilated and are the seat of chronic inflammatory changes. Purulent exudates and secretions accumulate in these abnormal reservoirs giving rise to constant cough and expectoration and progressive exacerbations of acute pulmonary infections. Although physical and x-ray examinations of the lungs give only approximate information concerning the localization of the disease, bronchographic study with iodized oil demonstrates accurately the distribution of the dilated bronchi. Detailed studies of bronchograms have revealed a characteristic distribution of bronchiectasis. More often than not only certain bronchopulmonary segments are involved, whereas

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others in the same lobe are normal. The basal bronchi of the lower lobes are the site of disease in the commonest pattern. The superior segments of the lower lobes are free of disease in most of these instances. However, the lingular segment of the upper lobe is likely to be involved along with basal segments of the left lower lobe, and the middle lobe is likely to be involved along with basal segments of the right lower lobe. Occasionally we have seen associated or isolated involvement of the lingula, middle lobe, superior segment of the lower lobe, or one of the segments of the upper lobes.

The technics of thoracic surgery have for some time now made it possible to resect diseased lobes completely. The principle of individually dissecting out the artery, vein, and bronchus to each lobe and ligating them separately, has produced excellent results and an admirably low mortality in the hands of many operators. Mass ligation of the lobar hilum is rarely necessary. The failure of lower lobe lobectomy totally to relieve symptoms led to the recognition by Churchill and Belsey and others of the necessity for giving particular attention to the lingula on the left and the middle lobe on the right. Improved results occurred in lower lobectomy when these were removed if involved.

Many excellent anatomic studies have demonstrated that the bronchopulmonary segment as opposed to the entire lobe lends itself to surgical removal. Multiple segmental resections thus afford the opportunity not only to remove all diseased portions of the lung but at the same time to conserve all the normal bronchopulmonary segments as functional units. This broadens the scope of surgical therapy to include many extensive bilateral cases who formerly were too serious risks.

Each bronchopulmonary segment has its own bronchus, arterial blood supply, and venous return. The bronchus and artery penetrate through the hilum into substance of the segment. The venous channels return along the surface of the segment. During the past two years we have applied the principles of individual ligation technic in suitable cases not to the lobe but to the bronchopulmonary segment. After the artery, bronchus, and vein to a segment have been ligated and divided, it is then possible by gentle blunt dissection to separate the diseased from the normal segment. Before this separation is started, the normal segments are inflated by raising of the intratracheal pressure. The line of demarcation stands out clearly and facilitates the separation. The plane is avascular. No significant damage is done to the normal segment.

The clamp and multiple suture method of separating segments

has serious disadvantages. First, it is impossible to place clamps precisely in the intersegmental plane. As a result, either too much or too little tissue is resected. Second, application of clamps across the lung is crude and traumatizing. Bleeding and hematoma formation are unavoidable. Third, excessive suture material is necessary. This increases foreign body reaction and predisposes to infection. Finally, puckering and distortion of the remaining segment is produced and re-expansion may tear the sutured lung surface.

The purpose of this presentation is to bring up to date our experience in segmental resections for bronchiectasis, an account of which has just appeared in an article by Overholt and Langer in the March, 1947, issue of *Surgery, Gynecology and Obstetrics*. Originally 23 segmental resections were performed on 21 patients. No deaths occurred in the series and all patients were greatly benefited. The series now includes 59 segmental resections in 48 patients covering the period from March 1, 1945, to Feb. 1, 1947. In addition, 4 non-segmental lobectomies have been performed in this group.

Technic. The patient is prepared for operation by paravertebral injection of 0.4 per cent procaine hydrochloride from the second to eighth interspaces and locally in the line of the incision. An endotracheal tube is inserted under topical cocaine anesthesia and the lower end of the saphenous vein is cannulated for infusion of fluid and blood during operation. With the patient in the face-down position, the chest is opened, usually through the sixth interspace. Usually no supplementary inhalation anesthesia is needed. Adhesions are divided and all parts of the lung are carefully palpated to confirm the bronchographic distribution of the disease and recognize involvement of any segments not noted in the bronchogram.

The decision is then reached as to what segments are to be removed and each segment is resected in the following manner: First, the segmental artery is identified, ligated, and divided. After the major fissure has been developed, the pulmonary artery and all its segmental branches are found below the apical and posterior branches to the upper lobe on the right or the common trunk of the apical and posterior branches on the left. After the upper lobe has been retracted toward the diaphragm, these branches are identified and the vessels found cephalad to the main stem bronchus. The segmental vein is next identified, ligated and divided. This is more easily found. Division of the inferior pulmonary ligament discloses the inferior pulmonary vein. Its inferior branch drains the basal segments of the lower lobe while its superior branch drains the superior segment of the lower lobe. The superior pulmonary vein,

which lies anterior to the main stem bronchus, is exposed by retracting the lung posteriorly. Its inferior division drains the lingula on the left and the middle lobe on the right. The superior division of the superior pulmonary vein drains the segments of the upper lobe. Attention is then turned to the segmental bronchus. Each of these can be found running parallel to and close to its corresponding artery. A row of fine silk mattress sutures is placed through the bronchus which is divided and the end cauterized with a bead of sodium hydroxide.

The remaining lung is now inflated by the anesthetist, which brings the line of demarcation between the normal and pathological segments into sharp relief since the divided segmental bronchus does not permit air to enter the abnormal segment. Traction is made on the distal stumps of the artery, bronchus, and vein and while the anesthetist maintains a slight amount of positive intratracheal pressure, the intersegmental plane is developed by gentle blunt dissections. Much of this may be accomplished by the forefinger. The line of least resistance is the avascular intersegmental plane. A few fibrous strands may be cut with scissors especially near the hilum. No artery or bronchus will cross the plane. Occasional small veins will communicate from one segment to its neighbor and these must be ligated and divided. The major veins will be found collecting along the intersegmental surface. Occasionally a fine bronchiole must be stripped out to its termination. As the visceral pleura is approached, it is cut allowing the diseased segment to come away completely. Little or no bleeding is encountered. The surface of the remaining segment may bubble slightly but this usually stops after a moist cottonoid pad has been laid on it for a few moments. No attempt is made to suture over the edges of the remaining segment. It is not necessary and might traumatize and distort this normal tissue. The end of the bronchus is now closed over with a series of interrupted fine silk sutures. If possible adjacent pleura is brought over the stump.

If more than one segment is to be removed on the same side, this is now carried out. The chest cavity is thoroughly irrigated with saline at body temperature. The bronchial closure is tested for leakage by raising the intratracheal pressure. One or two catheters, each with two or three lateral openings, are placed in the pleural cavity and the chest is closed meticulously in layers with interrupted fine silk. We use one or two pericostal sutures of chromic catgut to reinforce the closure; they are placed subperiosteally to avoid the intercostal nerves.

Postoperative Care. After segmental resection has been done,

the plan of management is like that used in routine lobectomy. The greatest concerns are the maintenance of a free airway and re-expansion of the remaining lung. The intrapleural catheters are connected to constant suction at a negative pressure of 4 to 8 cm. of water. These are withdrawn after 48 to 72 hours if there is x-ray or fluoroscopic evidence that the pleural space is obliterated by the remaining lung. Rarely must they remain for longer periods if there is evidence of leak from the bronchus or pulmonary surface. At times the tubes cannot be cleared or readjusted to evacuate pockets of fluid and air: aspiration is then required. Oxygen is not ordinarily necessary. It is felt that deeper breathing is more likely to occur in normal atmosphere. Patients are urged to cough and raise voluntarily. Manual support of the chest relieves pain and aids the patient. Frequent changes of position are encouraged. If these measures are insufficient to remove secretions, transnasal catheter suction, or rarely bronchoscopy, is employed.

SUMMARY OF CASES

Fifty-six segmental resections have been performed for primary bronchiectasis on 47 patients. The average age of these patients was 29 years with extremes of 6 and 57 years. Thirty-four patients were female and 14 male. The duration of symptoms was from 1 to 48 years. The most prominent symptoms were cough and expectoration, frequent colds, bouts of pneumonitis, and hemoptysis.

In this group of 47 patients, 21 had bilateral disease. Of these 21, 9 have had bilateral segmental resections. Nine more have had unilateral segmental resection but some of these will need a contralateral operation. The remaining 3 had complete lobectomy on one side and a segmental resection on the other side.

The only death in the series occurred at a time when we were using fine stainless steel wire sutures to close the bronchial stump. The cut end of a suture eroded through the pericardium into the pulmonary artery causing a fatal hemopericardium.

Analysis of the segments involved shows the usual dominance of the dependent parts of the lung. In 36 cases, one or more of the basal segments of the left lower lobe were involved. In 25 cases, the basal segments of the right lower lobe were involved, in 28, the lingula, and in 21, the right middle lobe. The superior segment of the left lower lobe was involved 3 times, once as an isolated lesion. The following segments were involved once each: the anterior segment of the left upper lobe, the anterior segment of the right upper

lobe, the apical posterior segment of the left upper and the apical segment of the right upper lobe.

A study of the 56 segmental operations performed will give a clearer conception of common combinations of segments involved. In 25 instances, the basal segments of the left lower lobe and the lingula were resected. The basal segments of the right lower lobe and the middle lobe were resected 13 times. The basal segments of the left lower lobe and those of the right lower lobe were resected by themselves 8 and 5 times respectively. Once the right middle lobe and the anterior segment of the right upper lobe was removed and once, the lingula and anterior segment of the left upper lobe. On one occasion, there was isolated involvement of the superior segment of the left lower lobe and it was removed.

Complications. Complications have been greater in this group than in simple lobectomies. Empyema has occurred 10 times following 56 segmental operations, an incidence of 18 per cent. Among these a bronchopleural fistula was demonstrated 6 times. All were treated by drainage except one patient who responded to aspiration and instillation of penicillin. Three others had a spontaneous pneumothorax which required trochar thoracotomy. The tube was connected to suction and successful re-expansion of the remaining lung obtained. Because of postoperative atelectasis, 6 patients required bronchoscopy. The one death has already been mentioned. The average period of hospitalization has been longer than with simple lobectomies.

Results. Of the 26 patients with unilateral bronchiectasis all have been greatly benefited, 18 have no symptoms at all, and 2 have slight residual cough but are in good health. We have inadequate follow-up in 6, most of whom have been too recently operated upon to draw any conclusions. Of the 9 who have had bilateral segmental resections, 6 are asymptomatic, 2 are greatly improved, and one has not had adequate follow-up. Of the 9 with bilateral disease but unilateral operation, only 2 are asymptomatic while 6 are improved. Some of these will eventually have a second contralateral operation and, we believe, be relieved of their residual symptoms. Of the 3 patients with bilateral disease who have had a lobectomy on one side and a segmental on the other, one is asymptomatic, one is dead, and one has not been adequately followed at present.

CASE REPORTS

Three brief case reports are given here.

CASE 1. J. M. was an 11 year old boy with a history of cough and expec-

toration dating back to an attack of whooping cough at the age of 5. There were frequent colds and expectoration amounting to a half cup of thick sputum during attacks. Physical examination revealed no conclusive findings except mild clubbing of fingers. Chest x-ray showed increased lung markings at the left base. Lipiodol studies revealed bronchiectasis involving the basilar segments of both lower lobes and early changes in the inferior segment of the lingula and the middle lobe. On June 24, 1946, after suitable preparation with penicillin and postural drainage, the basal portion of the left lower lobe and the inferior division of the lingula were resected. The postoperative course was uneventful and he was discharged on the nineteenth postoperative day markedly improved. He still had some cough and expectoration. On October 10 the basal segments of the right lower lobe and the middle lobe were resected. On the ninth postoperative day a pneumothorax was found; a tube was inserted for continuous suction, and re-expansion, although slow, was progressive. He was discharged in good condition on the fifty-first postoperative day. When last seen on Jan. 9, 1947, he was in good condition with negligible cough.

CASE 2. P. S. was a 13 year old boy giving a history of frequent colds and chronic cough and expectoration for 4 years. Admission was on April 29, 1946, for typical diabetic symptoms and he was found to have juvenile diabetes. Bronchograms revealed bronchiectasis of the basal segments of the left lower lobe and the lingula. After suitable treatment for his diabetes he was discharged and readmitted later for segmental resection of the basal divisions of the left lower lobe and lingula which was done July 2. He required chest aspiration several times because of intrapleural fluid. He was discharged on the nineteenth postoperative day in good condition and without cough or expectoration. Check bronchograms December 2 showed normal conditions and good re-expansions of the superior division of the left lower lobe.

CASE 3. W. G., a 28 year old male, was seen because of repeated hemoptyses of 4 years' duration. He had a chronic morning cough with slight sputum. He had negative bronchoscopy. Bronchograms revealed isolated bronchiectasis of the superior segment of the left lower lobe. On March 21, 1946, this segment was resected. The postoperative course was satisfactory and he was discharged on the nineteenth postoperative day. He was last seen 6 months after operation at which time he was in excellent condition.

DISCUSSION

The incidence of complications and the duration of the hospital stay has been greater in this series than after simple lobectomy. We believe, however, that the conservation of normal lung tissue made possible by this method of resection justifies the procedure. The conserved normal lung tissue serves three purposes. First, functioning lung tissue is saved. Second, more pulmonary substance is available to re-expand and fill the pleural space. Accordingly, there is less danger of decreasing the functional capacity of the remaining lung by overexpansion. Finally, in the majority of cases, there is less distortion of the remaining lung as it re-expands because the remaining superior segment of the lower lobe conforms to the trian-

gular space left behind and below the upper lobe and the middle lobe or lingula if they are present. .

Functional studies have not been undertaken at the present time but we are confident that they will emphasize the value of selective segmental resection. There seems to be little doubt that in extensive bilateral bronchiectasis this method will make available the benefits of resectional surgery to a group that would otherwise be forced to continue an uncomfortable and hazardous existence. In addition, we hope that further refinements in management will bring the incidence of complications to the satisfactory levels now enjoyed by complete lobectomy.

It should be mentioned that this study covers a group of patients selected because of segmental distribution of their disease. In many other patients, only entire lungs or entire lobes were involved. We have encountered a few patients, apparently suitable for segmental resection, in whom for technical reasons the procedure was abandoned and a total lobectomy done.

THE MANAGEMENT OF THE UNUNITED FRACTURE

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THIS paper is a résumé of our experience in performing 100 consecutive bone graft operations in a naval hospital during World War II. The principles involved are the same as those that we use in civilian life.

The only cases that are included in this series are those that necessitated grafts for non-union of fractures or those that presented bony defects to be bridged.

As the majority of these cases were the result of injuries of war, it is obvious that a large percentage of them were originally compound fractures, and of these there were a relatively large number with draining wounds on arrival at our hospital.

The incidence of non-union of fractures occurring in individuals engaged in military activities in the time of war is naturally much higher than in civilian life because of the many difficulties encountered in providing the necessary and adequate early treatment. To enumerate briefly some of the contributing causes, the following factors might be cited:

1. Compound fractures in which a proper and adequate debridement was not done.
2. Compound fractures in which the patient was not seen in time by the surgeon to do a proper debridement.
3. Relative frequency of compound comminuted fractures or fractures with loss of bone substance from high velocity bullets or shrapnel.
4. Incompletely reduced fractures or those in which there was an interposition of soft tissues.
5. Improper and ineffectual fixation after reduction.
6. Improper use of external fixation pin units.

There are three stages to be considered in the proper handling of the ununited fracture.

I. The Preoperative Preparation Stage

All draining wounds connected with the fracture must be eliminated by eradicating the underlying cause. In the majority of in-

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stances these are due to a localized area of osteomyelitis, single or multiple sequestra, or some foreign body. The surgical procedure to accomplish this should be as simple as possible. Many sequestra can be removed through the sinus tract with a hemostat.

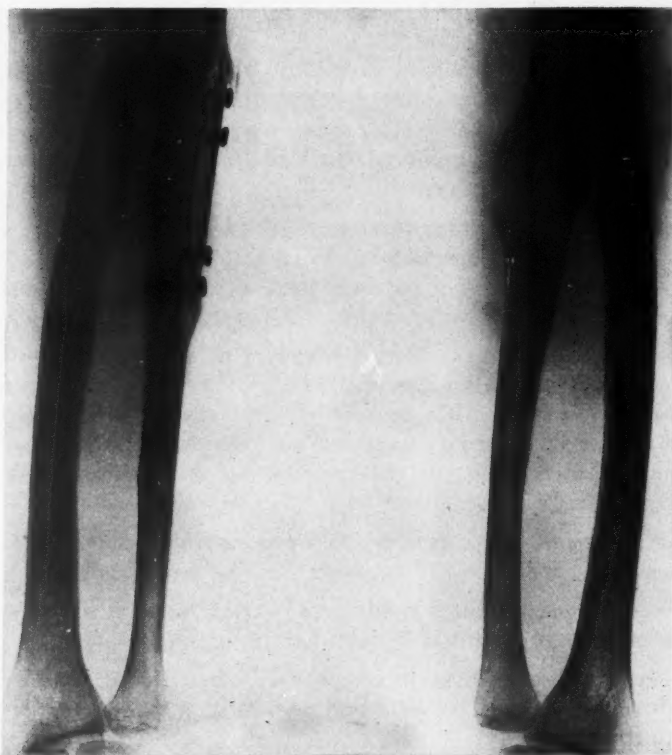


Fig. 1. Single onlay graft of the ulna for non-union. This demonstrates how the osteo-periosteal flaps are turned over the ends of the bone graft.

Wide incisions with extensive dissections and curettement are only mentioned to be condemned.

It is highly important that all soft tissue defects in the operative field that have been covered with split skin, pinch or Thiersch grafts, or scar tissue be resected and replaced with pedicle, tube, or sliding skin grafts prior to any bone grafting operation. Any surgeon who fails to do this will probably be chagrined on doing the first post-operative dressing to find that all of the soft tissues in this area have sloughed out and that the bone graft is exposed.



Fig. 2. Defect of radius.

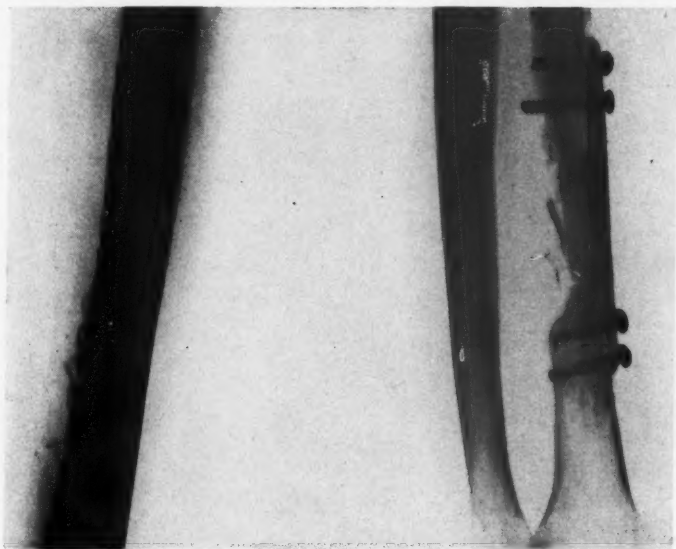


Fig. 2a. Defect replaced with full thickness fibular graft. This restores normal alignment of wrist joint.

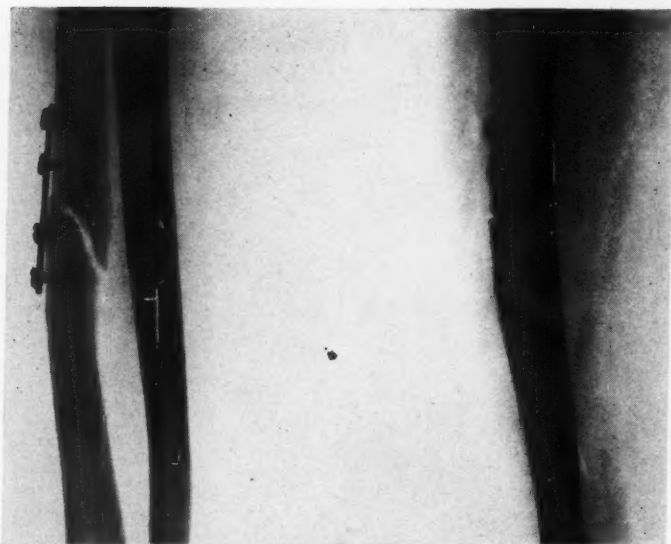


Fig. 3. Non-union of radius following use of bone plate.

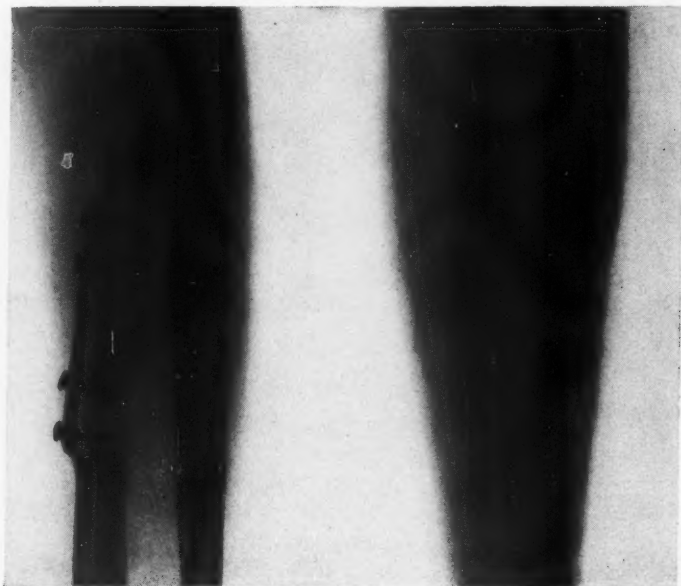


Fig. 3a. Fracture united after bone plate was removed and replaced with a single onlay tibial graft.

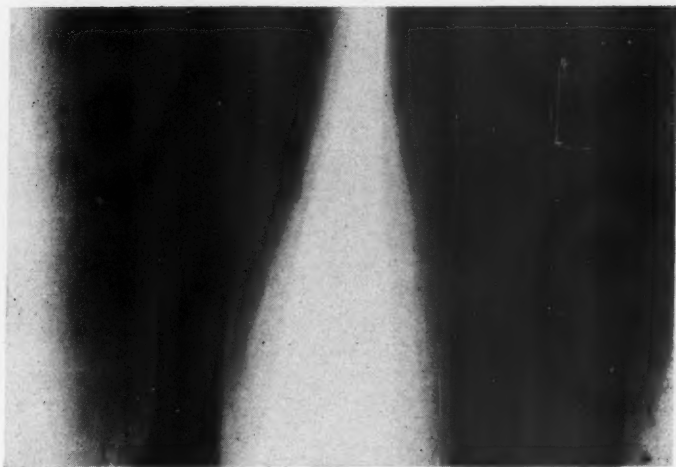


Fig. 4. Non-union of ulna.



Fig. 4a. Fracture united after single onlay tibial graft.

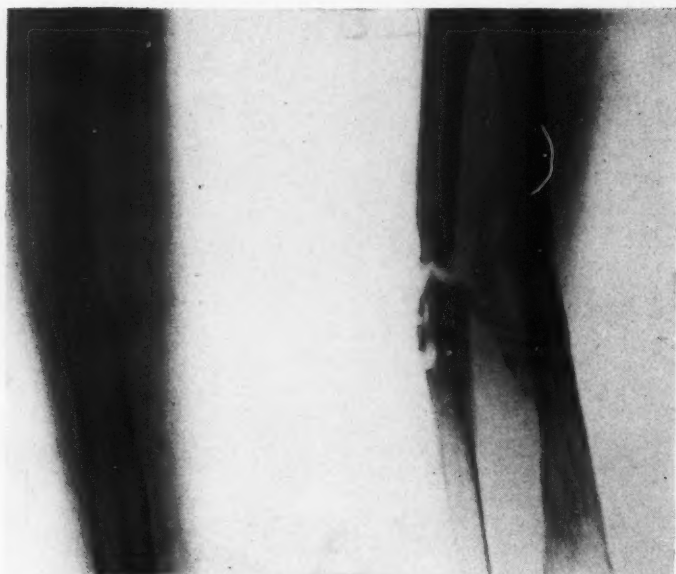


Fig. 5. Non-union of both radius and ulna with cross callus.

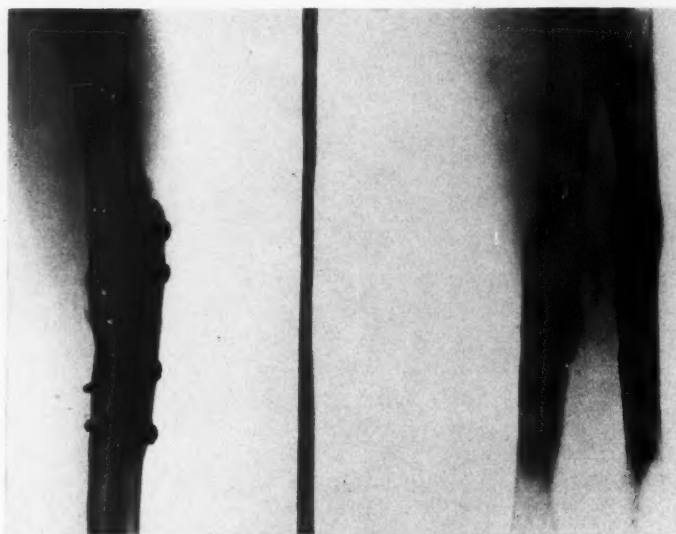


Fig. 5a. Both bones have united after single onlay grafts were used. The cross callus was removed at the time of the bone grafting. A pocket of pus was encountered during the operation but the wound healed by primary union.

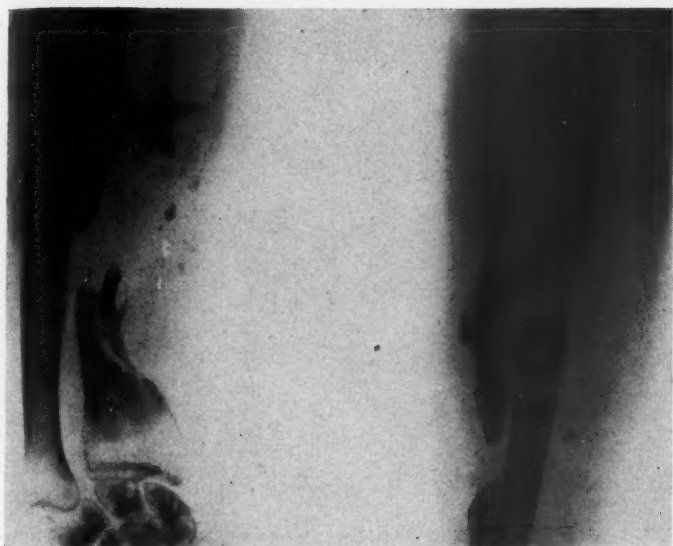


Fig. 6. Defect of radius.



Fig. 6a. Defect replaced with dual onlay grafts and cavity packed with bone chips. Distal end of ulna resected.



Fig. 7. Defect of ulna.



Fig. 7a. Defect bridged with dual onlay grafts.

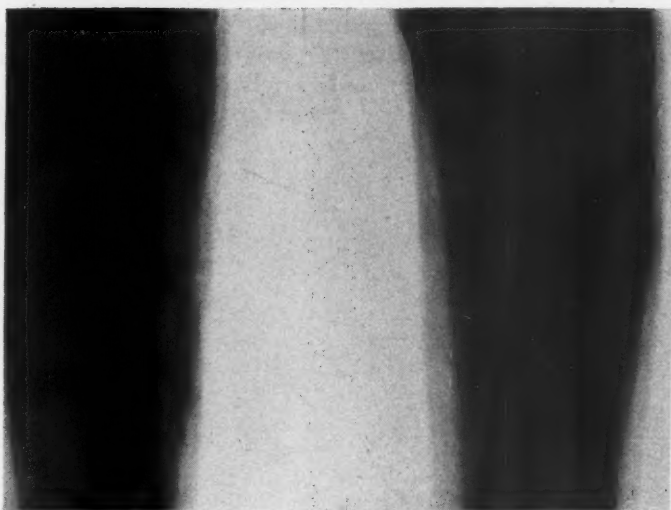


Fig. 8. Defect of radius.



Fig. 8a. Defect bridged with dual onlay tibial grafts.

It has been our experience that with the advent of penicillin and sulfonamide therapy the waiting period from the time drainage ceases, until the bone grafting can be safely performed has been cut down from the usual 6 months to 2 years to approximately 8 weeks.



Fig. 9. Comminuted fracture of radius and ulna. The distal ulna is partially united to the proximal radius with some cross callus to the distal radial fragment. The ulnar nerve was severed and retracted.

This waiting time is not actually lost to the patient, as it can be effectively utilized by the institution of physiotherapy, exercise, and massage to loosen up the adjacent joints and improve the circulation of the involved extremity. In fact, if casts or braces are not needed to maintain length we believe that they should be removed entirely.

This is even a worthwhile procedure for 2 or 3 weeks in the individual with a non-union that has never had any infection or wound at the site of the fracture.

Any bone graft operation is a major procedure. Hence the same

careful investigation of the patient's general condition is just as necessary as it would be preparatory to any major abdominal oper-

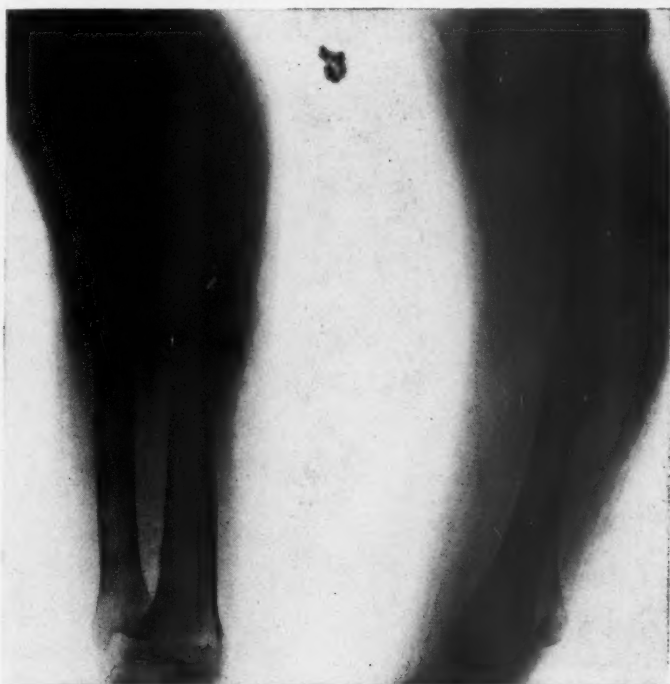


Fig. 9a. Both fractures are healed. A single onlay graft was used on the radius and dual grafts were used on the ulna. The shortening required to bring the bone fragments together made possible an end-to-end anastomosis of the ulnar nerve.

ation, and any deviation from the normal, such as an anemia, hypoproteinemia, vitamin deficiency, etc., must be corrected.

Patients who have had draining wounds are given penicillin for 24 hours prior to operation in the dosage of 25,000 to 50,000 units every 3 or 4 hours.

II. *The Operative Stage*

The choice of anesthesia should be left to the discretion of a well-trained doctor anesthetist. Personally, I prefer to use spinal anesthesia in lower extremity work, pentothal in the upper extremities, and intratracheal for the mandible.

Intravenous 5 per cent glucose and whole blood are started at the

beginning of the operation and continued throughout the procedure to compensate for loss of blood and body fluids. This will very materially help prevent shock.

The surgeon who expects to practice successful bone surgery must



Fig. 10. Defect of distal end of tibia.

be a crank on the subject of a rigid operating room technic. He must not only be perfect himself but must exert a careful watch over all his associates. "The chain is no stronger than its weakest link."

The draping of the patient is just as important as any step in the operation and should be completed by the surgeon and not a third assistant. Sterile rubber sheets should be placed around the involved extremities with the linen drapes to prevent contamination from soaking of blood and saline through the unsterile linen on the operating table.

The incisions are made through antiseptic soaked gauze or stock-

inette which is immediately clipped to the edges of the wound with skin clips. The gloves of the operating team must not come in contact with the skin at any time. Sponges are only used once and then discarded. Fine cotton is used for ligation of vessels. Mass ligation

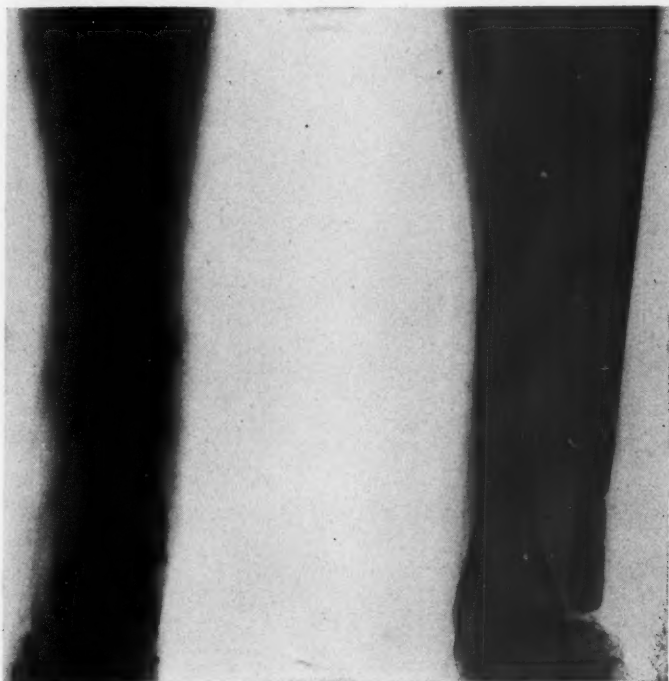


Fig. 10a. Defect restored by the use of a full thickness fibular graft which is stair-stepped on the distal end of the ulna. The radio-ulnar syndesmosis is simulated by the use of a doubled strip of fascia lata around the distal end of the graft and through a large drill hole in the distal end of the radius.

must be avoided. Gentleness in handling the tissues is observed throughout the operation. No one except the surgeon is permitted to put his fingers in the wound and he as rarely as possible. His gloves should be changed several times during the procedure.

Upon the exposure of the bone the periosteum should be disturbed as little as possible. All scar tissue is removed from the ends of the bones and the medullary canal is widely opened with drill holes. Screws retaining the graft or grafts in position should be placed as far from the fracture site as possible and must traverse both cortices. After the operation is completed a debridement is performed of all traumatized or devitalized muscle or soft tissues.

The wound is dusted with sulfanilimide. All dead space is eliminated and the skin is closed with interrupted cotton sutures.

Many types of grafts were utilized in this series. We used prin-



Fig. 11 Non-union of a fracture of the middle third of the clavicle.

cipally sliding inlay grafts in fractures of the humerus, femur, and tibia. A single-bladed saw was used to cut the graft in a beveled position. We always attempted to use at least $\frac{1}{3}$ of the circumference of the shaft of the bone, so that there was a large, sturdy bridge across the line of fracture, which was retained in position with Vitallium screws. In using onlay grafts an osteo-periosteal flap is lifted with a chisel from the recipient area. The ends are left attached which are then turned down over the graft when it is placed on the shaft. This seemed to hasten the healing or attachment of the graft to the recipient site. Dual grafts were used in cases of bony defects. Fractures of clavicles with either non-union or bony defects healed very rapidly with the use of a split rib, with bone chips of a second rib being placed in the defect. The split

grafts were retained in position with either rustless steel wire or chromic catgut. In defects in other bones we frequently used bone chips from the ilium in addition to the large grafts. In fractures of

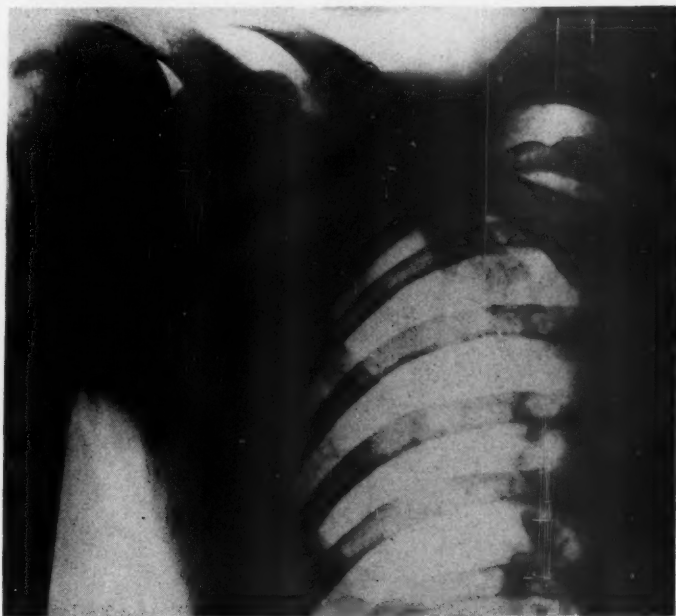


Fig. 11a. Union of the fracture occurred after the fibrous tissue was removed from the ends of the bone fragments, the medullary canals opened with drill holes, and a split rib graft used as two barrel staves were placed around the clavicle at the fracture site.

the lower end of the radius with shortening we were able to regain length by the use of full thickness fibular grafts by stair-stepping them on each end. Ribs and ilium grafts were both used in fractures of the mandible. Individuals with fractured mandibles with loss of bone substance usually arrived at the hospital without any intradental fixation which resulted in a shortening and deformity of the mandible. In order to restore this shortening an operation was performed inside the mouth in which all soft tissues were divided, the normal alignment restored and retained with a prosthetic appliance. The wound was packed with vaseline gauze which was changed at intervals until it healed. During this time the patient received the usual amount of penicillin. Two months after the intra-oral wound had healed the actual bone graft operation

was performed through an external incision. By this method we were able to obtain excellent results, both cosmetically and functionally.

In some patients with bone defects in the shaft of the humerus or



Fig. 12. Defect of clavicle from sniper's bullet.

in the bones of the forearm in which it was not necessary to maintain normal length, better results were obtained by stair-stepping the ends and fixing them with screws. This was a particularly useful procedure where there was the complication of a severed and retracted nerve. There were some cases of fractures of the radius in which it was impossible to restore the normal length. In these instances the distal end of the ulna was either resected or a stair-step operation performed.

Thoracic cage defects present an interesting problem for repair. In the cases that we did, the following procedure was used. The original skin flap extends down to the intercostal muscles. Gutters were made in these in the line in which the new ribs were to be placed so that the rib was in contact with the parietal pleura. The ends of the ribs at the edge of the defect were resected back to good bone with the periosteum being left intact. If the other end of the defect was along the sternum, a longitudinal split was made in this

structure with an osteotome. The ribs to be transplanted were removed subperiosteally from the opposite side of the chest, leaving one rib between each rib removed. One end of the transplant was



Fig. 12a. The defect is packed with multiple bone chips from a rib. A second rib was split and used as barrel stave grafts around the clavicle.

sutured to the rib end with rustless steel wire and the periosteum closed around it. The other end was wedged into the longitudinal split in the sternum where it was also wired with rustless steel wire. We found that the ends of the donor and recipient ribs would heal with bony union but that a fibrous union would occur between the ribs and the sternum or the costal cartilage. This procedure gave excellent results, both cosmetically and functionally, and in particular improved the morale of the patient.

III. *The Postoperative Stage*

All patients were placed in padded plaster casts. Blood transfusions were given as often as necessary to preserve the normal blood count. Penicillin was continued in doses that were started preoperatively for a period of a week or ten days. In some instances sulfadiazine was given in addition to the penicillin. These patients were permitted to be ambulatory as soon as possible after the operation.



Fig. 13. Non-union of fracture of proximal end of humerus.



Fig. 13a. Sliding inlay graft was used to obtain union.



Fig. 14. Non-union of humeral condyle fracture producing an instability of the elbow joint.

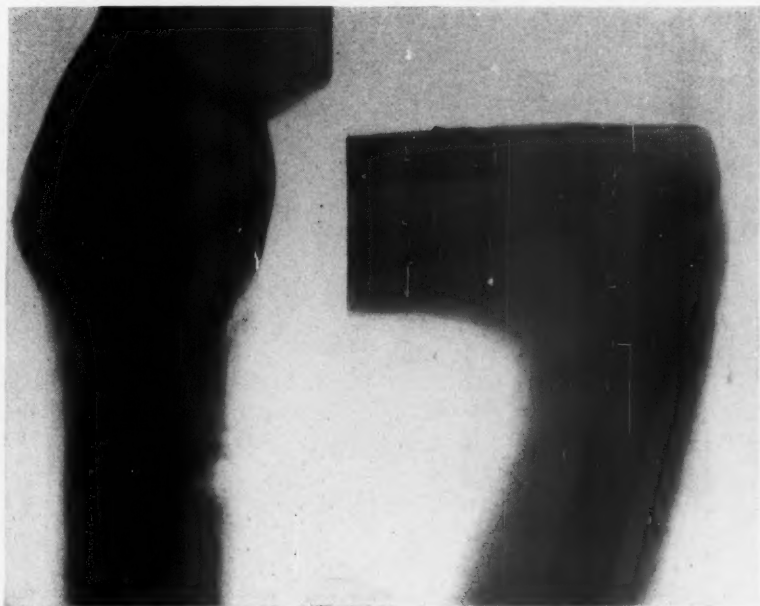


Fig. 14a. Fracture united by use of tibial onlay graft. A good functioning elbow resulted.



Fig. 15. Non-union of a femoral shaft fracture following bone plating.



Fig. 15a. Antero-posterior view after the fracture united following the use of a sliding inlay graft.

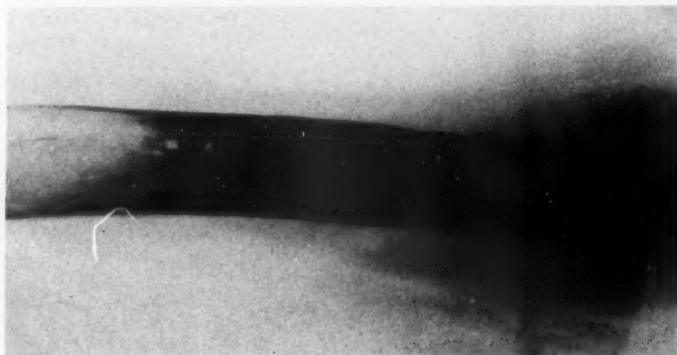


Fig. 15b. Lateral view of the same fracture.



Fig. 16. Comminuted fracture of the tibial shaft with fair union of the proximal fragment but a fibrous union of the distal.



Fig. 16a. Solid union of both fractures after a long sliding inlay graft was placed across the fragments.

Occupational and physiotherapy were a part of the postoperative treatment.

It might be worth while to mention the ideal position for fixing the hand and forearm in scaphoid fractures which are either fresh or have been grafted and drilled for non-union. The hand is held in the position of a clenched fist with the thumb in complete abduction. The cast extends from just below the elbow to the distal palmar crease and to the interphalangeal joint of the thumb.

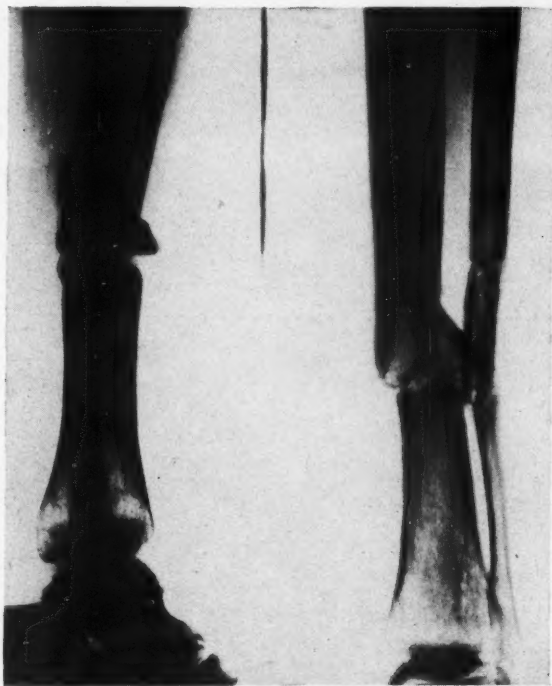


Fig. 17. Non-union of fracture of the tibial shaft.

The distribution of the grafts in the various bones of the body in this series were as follows: Mandible, 6; clavicle, 4; humerus, 7; radius, 16; ulna, 13; radius and ulna combined, 9; scaphoid, 10; thoracic cage defect, 3; femur, 10; tibia, 18; internal malleolus, 4.

The following is a résumé of the end results. In 4 cases of the originally compound fractures a small pocket of pus was encountered at the time of operation, even though there had been no drainage from the wounds for at least two months. In all of these cases we proceeded with the bone graft operation and the wounds were closed. In these individuals large doses of sulfadiazine were

given as well as 100,000 units of penicillin every 3 hours. One of the wounds healed by primary union. Two drained but eventually healed with preservation of the grafts and union of the fracture. In the fourth case a graft of the radius was lost, but was unusual in



Fig. 17a. Solid bony union following the use of a sliding inlay graft.

that the wound healed originally, then started draining three months after the operation with sequestration of the bone graft. At a later date another graft was applied to the radius, but the end results were unknown.

Of the 10 ununited scaphoid fractures 6 healed with bony union following grafting. Of these 4 returned to regular duty and 2 to limited duty because of some pain and about 25 per cent limitation of motion. There were 4 in which there was no union, but apparently enough fibrous union occurred so that these men could return to limited duty status. There were the following cases which healed following bone grafting but were sent to limited duty because of



Fig. 18. Defect in upper third of the tibia.

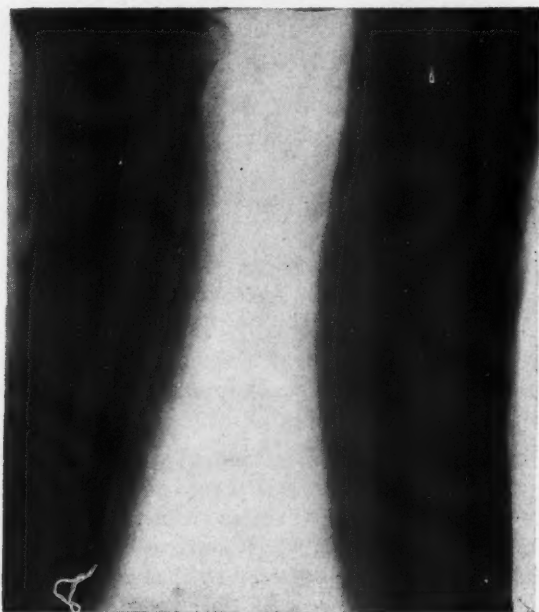


Fig. 18a. One long inlay graft, two onlay grafts, and bone chips in the defect were used to obtain union.

nerve injury: 4 radius, 3 ulna, 3 radius and ulna, and 2 humerus. All the remainder returned to regular duty.

There was only one individual in whom a fracture of the tibia occurred following removal of a bone graft, and this was approximately 10 weeks following the operation. All of the individuals who had grafts removed from the tibia were usually immobilized in a cast or brace for a period of 2 to 3 months. This was particularly true if large grafts had been removed.

CONCLUSIONS

1. The time element in the original treatment, the type of fracture, and the surgeon all contribute to the occurrence of non-union in fractures.
2. Bone grafting is eminently successful if certain rules are observed in the preoperative, operative, and postoperative care of these cases.
3. A high percentage of the patients who have undergone bone graft operations should be able to return to normal life activities.

The author would like to express his appreciation to Lieutenant Commander John Hundley, U.S.N., for his invaluable assistance in collecting data and statistics for this paper.

AN ANALYSIS OF 1,100 CONSECUTIVE THYROIDECTOMIES

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IN a series of 1,091 consecutive thyroidectomies, as of Jan. 1, 1947, there have been 5 postoperative deaths, 3 of which were in negroes, an overall mortality rate of 0.45 per cent; 500 consecutive operations were first performed with no deaths,² and all deaths occurred following operation in the second series of 591 operations. To analyze properly the death rate in a large series of cases it is necessary to break down and classify the cases into the various subtypes of the general classification of goiter. Here almost insurmountable difficulties are encountered. In a paper, "Mortality in Thyroid Surgery,"⁴ now in press, an attempt has been made to classify this series. The present paper will review these findings and presently present also the serious postoperative untoward complications encountered in this series.

The more one tries to correlate the patient's clinical picture with the gross appearance of the gland and then with its histologic pattern, the more confused he is likely to become. Most of us doing much thyroid surgery are not at all satisfied with the classifications of goiter at our disposal. Neither the Plummer classification nor that advocated by the American Association for the Study of Goiter is entirely satisfactory. It has never been clear to me just what is meant by "non toxic diffuse goiter." Exophthalmos may or may not be present in "toxic diffuse goiter," so why call them all "exophthalmic goiters"? A full-blown Grave's disease is readily recognizable, as is, generally, a non toxic nodular goiter. How would you classify a non toxic nodular goiter with areas elsewhere typical of toxic diffuse goiter? The fetal adenomas and the cystic, degenerating, hemorrhagic adenomas, for example, fall under the general classification of non toxic nodular goiters, yet we are all familiar with the diverse pathologic picture of each. However, relying almost entirely on the pathologic reports based on the histologic picture and remembering that frequently the clinical and pathologic findings do not coincide, the series can be fairly satisfactorily classified as outlined in Table 1.

All of these patients have undergone complete physical examination with carefully elicited histories and the necessary laboratory

TABLE 1

<i>Classification</i>	<i>Cases</i>	<i>Deaths</i>	<i>Per Cent</i>
Diffuse goiter with hyperplasia.....	564	1	0.17
with marked or fulminating hyperplasia.....	160	0	0.0
with moderate hyperplasia.....	404	1	0.24
Non toxic nodular goiter.....	374	3	0.8
Toxic nodular goiter.....	116	0	0.0
Others*	37	1	2.7
Total thyroidectomies	1,091	5	0.45

*Including Riedel's thyroiditis, Hashimoto's thyroiditis, chronic thyroiditis, simple colloid goiter, abnormally large normal glands, malignancies, etc.

studies. Basal metabolic studies are frequently worthless, especially if only one reading is taken. Several determinations made at the proper times, under proper conditions, by the same technician and with the same machine may be of distinct relative value, particularly in evaluating progress preliminary to surgery in the hyperplastic gland. More reliance should be placed on the clinical evaluation of the patient as evidenced by a slowing of the pulse rate, decrease in nervous manifestations, possibly some gain in weight (although it is not necessary to defer surgery because one may be slow in gaining), the time the breath can be held and especially the better mental attitude and decreasing apprehensiveness of the individual. Certain laboratory determinations such as blood cholesterol, galactose tolerance, and so on, are of academic interest and of value in teaching, provided, first of all, the student is taught to observe the patient as well as a laboratory report. This is so necessary in thyroid disease. Many patients in this series have been operated on who had been told to forget it—the "breathing test" was normal! Hertzler was eternally right when he said: "Don't let the tin can do your thinking for you!"

DIFFUSE GOITER WITH HYPERPLASIA

It will be noted that there are 564 cases of diffuse goiter with hyperplasia, 160 or 28.4 per cent of which showed clinically and pathologically marked or fulminating hyperplasia—typical advanced Grave's disease. In this subgroup there were no deaths, no semblance of crises and convalescences were generally smooth. This is attributed largely to the *intravenous* use of iodine in fairly large

doses in preparing these patients for operation and to a reasonably rapid operative technic. The more manipulation and manhandling of the toxic gland the less likelihood there is for a smooth convalescence.

Of the diffuse goiters with hyperplasia 71.6 per cent, or 404, showed on section moderate hyperplasia. These are all toxic goiters and there is bound to be some overlapping, but this figure is based entirely on pathologic reports, separating this subgroup from the fulminating hyperplasias. Basal metabolic readings in this group varied from minus readings to as high as plus 60 per cent—wholly inconsistent with the microscopic, and in many instances, the clinical picture. Many of these glands were undergoing involution. Many patients are referred with a note reading something like this: "When first seen two months ago, she had a definite goiter and was extremely nervous. She was placed on iodine and is now much better." In such cases it is just about impossible to know with what one is dealing. Some are borderline cases with definitely early hyperplasia. These may present a real problem in diagnosis. Generally speaking, delay is not dangerous in such cases and if a policy of "watchful waiting" is assumed, sooner or later the disease will manifest itself. But, there is no reason in waiting for a full blown Grave's disease to develop before resecting the gland. There is about as much sense in telling a patient with an acute appendix that it has not ruptured as yet, so we'll just wait! In such cases I place much reliance on a therapeutic test with iodine. When one is suspicious of an early toxic goiter and the patient is placed on Organidin in 10 minim doses thrice daily for two weeks and she returns saying: "I feel, so much better, Doctor, my nerves are certainly improved," then you can be reasonably sure you are dealing with an early toxic goiter. This improvement coincides too often with the pathologic findings to have much doubt as to its efficacy. In this series of 404 patients with moderate hyperplasia there was one death.

NODULAR GOITER

The nodular goiters include the adenomas; fetal adenomas, cystic, degenerating, hemorrhagic adenomas, colloid inclusions and so on. Those showing hyperplasia on microscopic examination are classified as toxic nodular goiters. This checks fairly accurately with the clinical findings of toxicity; however, only a few have been markedly toxic. Probably we do not see the number of severely toxic nodular goiters in this section of the country as are reported in other sections. Maybe it is a question of what we call a toxic

nodular goiter! Of the nodular goiters, 374 were classified as non toxic with 3 deaths, and 116 as toxic with no deaths. No malignancies are included in this group. Too often a patient will refuse operation, or will not be seen by the surgeon, because he has been told "that little lump is not bothering you, your breathing test is normal." There are at least three reasons why *all* non toxic nodular goiters should have the benefit of surgery: (1) they are not likely to become smaller—but will almost certainly increase in size, (2) they may become toxic and (3) about 5 per cent of them will show malignant change. The operative risk in the early, smaller, non toxic goiters is practically nil.

OTHER CASES

In the group of 37 remaining cases, classified as "others," there was one death—a patient with Riedel's thyroiditis who died of bilateral pulmonary infarction. In this small group are the malignancies, Riedel's strumas, Hashimoto's strumas (involved goiters?), simple colloid goiters, abnormally large normal glands, and so on. These are interesting conditions, but will not be discussed in this paper except from a mortality standpoint. There have been no operative deaths following operation, radical or palliative, for malignancy. Brenizer and I discussed the subject of thyroid malignancy rather thoroughly in 1940 and the reader, if interested, is referred to that paper.¹

DISTRIBUTION ACCORDING TO RACE AND SEX

When this series is broken down into race and sex, some interesting facts are revealed as shown in Table 2.

TABLE 2

<i>Race and Sex</i>	<i>No. Cases</i>	<i>Deaths</i>	<i>Per Cent</i>
White	1016	2	0.2
Colored	75	3	4.0
White females	925	2	0.22
White males	91	0	0
Colored females	66	3	4.58
Colored males	9	0	0
Total males	100	0	0
Total females	991	5	0.5

There have been no deaths in a series of 100 males and 5 deaths in 991 females. There were 2 deaths in 925 white females (0.22 per cent) and 3 deaths in 66 negroes (4.58 per cent). The distribution of goiterous types among the races is about the same in my series as it is among the sexes. No malignancies have been encountered in 75 colored patients. Contrary to reports elsewhere toxic goiter in the southeast does not seem to be more severe clinically among the colored patients than among the whites—in spite of a mortality of 4.0 per cent in the colored and 0.2 in the white races. The difference in mortality is consistent with that reported in other sections and is difficult to explain.

TABLE 3

Causes of Death

1. Bilateral pulmonary infarction. White
 2. Acute hemorrhagic nephritis. White
 3. Undetermined—likely a "liver death." Colored
 4. Pulmonary embolism. Colored
 5. Cardiac collapse and/or cerebral accident. Colored
-

INTRAVENOUS IODINE

Most internists and surgeons interested in diseases of the thyroid are familiar with the mortality statistics from other sections of the country and with the larger mortality among negroes, especially in the South. This very low over-all rate compares favorably with other reports. There have been a number of severe risks such as fulminating hyperplasias, "burnt out" goiters with severe cardiac damage, "iodine fast" toxic goiters, one woman was admitted under restraint in violent crisis—and so on. No ligations have been done and only 2 two-stage operations performed. The use of intravenous iodine and glucose will take care of the toxic cases and rapidly prepare them for operation. Organidin in 100 to 150 minim doses given in 1000 c.c. of 10 per cent glucose daily for from 3 to 5 days will prepare these toxic cases for operation. Thiouracil or any of the allied drugs have not been used in this series as it is believed that as much, or more, can be accomplished with intravenous iodine. The record tends to substantiate this belief. These are dangerous drugs and it is difficult to become enthusiastic over any drug which does not alter the histologic picture of the hyperplastic gland—except perhaps to make it more hyperplastic. It would seem that *iodine*

compensates for an increased iodine requirement and inhibits excessive secretion of the thyroid hormone; fulfilling this function through the anterior pituitary by checking the production and secretion of the thyrotropic hormone, whereas thiouracil probably inhibits the production of the thyroid hormone and stimulates the production of the thyrotropic hormone of the anterior pituitary. The result is something of a paradox—lowering the basal metabolic rate and producing hyperplasia of the thyroid parenchyma.³ Most men using thiouracil are now using it in conjunction with iodine. These remarks are not to be construed as anything like an attack on those excellent surgeons using thiouracil, probacil or any of the allied drugs. There are undoubtedly cases in which they are of great value. Perhaps it is the wiser policy for those of us in individual private practice to recall Pope's couplet:

"Be not the first by whom the new is tried,
Nor yet the last to lay the old aside."

MORTALITY IN NORTH CAROLINA AND SOUTH CAROLINA

The mortality rate for North Carolina and South Carolina for 1944 and 1945 as compiled by the Hospital Section of the Duke Endowment is shown in Table 4. Unfortunately the series is not broken down into race and sex, nor are cases classified as to types.

TABLE 4

THYROIDECTOMIES IN NORTH CAROLINA AND SOUTH CAROLINA
(As compiled by the Duke Endowment)

	Number	Deaths	Per Cent
1944			
North Carolina	1,076	17	1.6
South Carolina	382	5	1.3
Total	1,458	22	1.5
1945			
North Carolina	1,086	12	1.1
South Carolina	390	10	2.6
Total	1,476	22	1.5

(The Endowment does report that in 16 negro hospitals in the two States there were 70 thyroidectomies performed in 1945 with a mortality rate of 5.7 per cent. This does not include hospitals such as Duke, Roper and others that care for both white and colored patients.)

A total of 2,934 thyroidectomies were performed in these two years in North Carolina and South Carolina with 44 deaths, a mortality of 1.5 per cent. There were 2,162 operations in North Carolina with 29 deaths, a rate of 1.3 per cent. This rate is remarkable when one considers that it represents the work of many surgeons—men of varied ability in thyroid surgery, most of whom do only occasional thyroidectomies, working in many hospitals in various localities over the two States.

FACTORS INFLUENCING MORTALITY

In general, it may be inferred that the following factors influence the mortality rate in thyroid surgery:

(1) As accurate a clinical diagnosis as possible predicated upon a good history and careful general examination with the necessary laboratory determinations. It is so important that the patient's general condition be carefully evaluated.

(2) Proper preparation of the patient for operation. Indeed this applies to other conditions than toxic diffuse goiter. Everyone knows the efficiency of iodine in the preoperative preparation of the toxic diffuse goiter patient and how it has reduced a mortality of nearly 25 per cent to the low rate achieved today. The use of intravenous iodine and glucose in the very toxic cases is of real significance and in this group there have been no deaths and no crises. The discreet use of digitalis and quinidine is frequently essential in managing cardiac complications.

(3) Proper operative technic. Each experienced thyroidectomist has his own method of operating and this is adapted to the conditions found in the neck, but a reasonably rapid technic, good exposure, adequate hemostasis and the avoidance of such structures as the recurrent laryngeal nerves and the parathyroids, certainly contribute to a better mortality and morbidity.

(4) Proper postoperative care and good nursing have salvaged many patients. The cooperation of the internist and surgeon is never more needed than in some goiter cases and the services of an alert, intelligent and sympathetic nurse are invaluable.

(5) For some unknown reason there is a higher mortality rate among negroes.

The "proper selection of cases" is not a factor in the mortality of thyroid surgery unless the surgeon is one who fears what he considers a "bad risk" and would rather see his own rate kept low than to offer the patient the benefit of thyroidectomy. Many patients

have been operated on with serious cardiovascular complications, who were told that the heart was too bad to stand an operation! As a matter of fact, it is in such cases, especially the toxic nodular goiters, that frequently the most brilliant results are obtained. One woman had been on quinidine for nearly a year following an incomplete operation in another state. She had been refused operation by two or more surgeons. After three doses of intravenous iodine with the quinidine continued, a secondary thyroidectomy was done. After one month she was off of quinidine and has been off of it now for nearly two years, and is clinically well.

COMPLICATIONS OF GOITER SURGERY

There are certain severe complications following goiter surgery against which the surgeon should be particularly cautious. In spite of careful preoperative preparation, a meticulous technic and good postoperative attention, they will sometimes occur. Table 5 outlines the most dreaded of these complications.

TABLE 5
SEVERE COMPLICATIONS OF THYROID SURGERY

Total thyroidectomies	1091
Deaths	5
Crises	None
Bilateral abductor cord paralysis	
Immediate and permanent.....	3
Delayed, scar contraction.....	1
Tracheal collapse	None
Hemorrhage, severe	5
Postoperative tetany	2
Postoperative psychosis	1
Serious infection	None

The most feared complication is, of course, death. A so-called "liver death" is best guarded against, in my opinion, by daily supportive injections of 10 per cent glucose and a reasonably rapid operative technic. Death may occur from numerous causes including the complications listed above. The heart is not to be feared in goiter surgery, provided intravenous iodine is properly used and digitalis, quinidine or other cardiac supportatives discreetly administered, preferably by a good internist. This record bears this out.

In the entire series there has been no instance of crisis following operation, and but 3 cases of crisis have been seen. Two were in consultation with other surgeons and both patients responded promptly to intravenous iodine. The third was a patient of my own who was admitted to the hospital in violent crisis and under restraint. After the first intravenous injection of 150 minims of Organidin in 1000 c.c. of 10 per cent glucose, she promptly responded and calmed down. Her convalescence was smooth. *Crises do not occur when properly treated with iodine intravenously.*

There have been 3 instances of primary permanent bilateral abductor cord paralysis. One of these occurred in a woman following her fourth operation. She had had three thyroidectomies, two by me, over a period of 6 years for non toxic nodular goiter—the pathology being determined by the late Dr. Harvey Barrett, one of the best pathologists the South has ever produced. Three years after her third thyroidectomy she returned to me with several hard small nodules in the region of the thyroid. These were biopsied and malignancy reported on frozen section. Radical operation was performed and unfortunately both nerves injured. Tracheotomy was done and she wore her tube until death about a year later. Another died in labor 18 months after her thyroidectomy. The third had a Kelly operation successfully performed by a local laryngologist. A fourth patient had had a resection of one lobe only for toxic diffuse goiter by a surgeon in another state. She came to me several months later extremely toxic. The cord on the operated side was in the cadaveric position and fixed. Naturally, the operation was performed with unusual care and she had a splendid result. Six months later she returned with all the symptoms of bilateral cord paralysis and laryngoscopic examination revealed an involved cord on my operative side! This can be attributed only to scar tissue formation. She refused further surgery and has not been heard from since. The first principle of treatment of cord paralysis is to avoid its occurrence. If one will stay inside the capsule and leave a wedge of tissue against the trachea, the chance of a permanent paralysis is slight. It is doubtful if the nerve is apt to be injured where it can be visualized, but some surgeons dissect out the nerve routinely. Not infrequently there will be a temporary huskiness of the voice due, perhaps, to stretching of the nerve in rotating the gland or maybe to clamping it inadvertently temporarily. This complication has been noted occasionally. All of these have cleared up entirely with normal motion in the cords subsequently.

Laryngoscopic examination is important after every thyroidectomy and the surgeon should be equipped to handle the laryngo-

scopic mirror himself. Especially should such examination be done on patients preoperatively who have had previous thyroidectomies.

It is distressing to see the plight of a patient with severe post-operative hemorrhage and it is astonishing the small amount of hemorrhage (depending on location) necessary to place the patient in a precarious condition. There have been 5 cases of severe post-operative hemorrhage necessitating reopening of the wound, control of bleeding and resuture. All occurred in elderly people with nodular goiters. Fortunately there were no fatalities, but prompt action is essential. The wound should be opened quickly, the clots evacuated and the wound packed or the bleeding point ligated. Resuture can be done immediately or subsequently. It is a serious complication, and unless handled promptly and efficiently may prove fatal. I do not know how to prevent it. It is apt to occur in elderly individuals with more or less sclerosis, no matter how careful hemostasis may be. It is not a serious complication *if handled quickly*, but delay may prove disastrous. Severe hemorrhage may occur following thyroidectomy in those who have been "cured by x-ray." The vascularity of the gland following thiouracil is greatly increased.

Postoperative tetany has occurred only twice in the entire series. The first patient recovered in several months on calcium and A. T. 10. The second case occurred last December and is still on calcium by mouth. She will recover. Blood and urine calcium studies were made in each case and checked with the clinical findings. Each of these cases was a true tetany, but it must be remembered that increased calcium excretion may be associated with severe thyrotoxicosis and this may produce the symptoms. Even in the presence of a positive Chvostek's sign, such symptoms will subside promptly after a few calcium injections. Again, if one will keep inside the capsule and leave a small wedge of tissue the parathyroids are not likely to be injured except, perhaps, from interference with their blood supply. Sometimes parathyroid bodies will be found in the thyroid substance at section. It is wise to examine the excised gland at the operating table and if parathyroid bodies are recognized, they can be imbedded in soft structures.

One patient, a colored woman, developed a postoperative psychosis several days after operation. A resection had been done with comparative ease for a non toxic nodular goiter. She had to be confined to an institution and so far as is known she is still there. This has occurred following hysterectomy in a colored patient. It cannot be avoided nor can it be anticipated.

There have been no instances of severe infection, nor is there any reason why there should be. Modern aseptic technic, modern chemotherapy and the rich blood supply to the part should preclude this. Several cases have been those of intrathoracic goiter and many have had substernal and subclavicular projections. Mediastinitis has not occurred.

Remote complications involving ultimate results, recurrences, scar contractions and adhesions, keloid formation, etc., will not be discussed in this paper.

Just a word about anesthetics in thyroid surgery. For several years a trained anesthetist administering cyclopropane-oxygen, frequently supplemented with helium has been used. Ventricular fibrillation said to be produced occasionally by cyclopropane has not been encountered. More recently sodium pentothal-oxygen has been administered quite successfully. Local anesthesia has been virtually discarded. Ether probably has no place in thyroid surgery. Some surgeons use avertin, usually with an inhalation gas. Avertin is metabolized by the liver, and since many—probably the majority—of toxic cases have varying degrees of liver damage, it would seem to be an unwise procedure.

SUMMARY

An overall mortality rate of 0.45 per cent is reported in 1,091 consecutive thyroidectomies. When broken down, this reveals a rate of 0.2 per cent in white patients and 4.0 per cent in colored patients. There were no deaths in 100 males. This low rate can be maintained by proper evaluation and preparation of the goiter patient, the use of intravenous iodine in the toxic patient, the co-operation of a good internist, a meticulous and reasonably rapid operative technic and good postoperative care. A minimum number of postoperative complications is predicated also upon this statement. It is reasonable to assume that the surgeon more experienced in thyroid surgery is likely to have a lower mortality, but it must be remembered that he is also likely to have the more severe risks!

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THE ABUSE OF PELVIC SURGERY IN THE FEMALE

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BECAUSE the practice of medicine, like most other things, is undergoing constant change, it is sometimes helpful to question the wisdom of our ways. More specifically, and for purposes of this discussion, we may inquire whether medical knowledge has advanced sufficiently to render some of our time-honored operations on the pelvic organs of the female less desirable or even unnecessary. Does increased knowledge regarding physiology of the generative organs call for curtailment of surgical procedures long accepted as standard fixtures? The divergent views held by physicians regarding the need for certain types of pelvic surgery, plus the story told by the removal of countless organs now recognized as normal, would indicate that some attention to this subject is in order.

Before proceeding further I want to emphasize the importance of sound surgery wherever performed. The addition of surgery to our therapeutic armamentarium has meant the relief of untold suffering as well as the saving of countless lives. Properly indicated, good surgery is today an important and certainly the most spectacular therapeutic weapon serving mankind the world over. Increased knowledge concerning organ physiology may render some operations obsolete but, for the same reason, new fields for surgical endeavor are also opened up. Certainly surgery will continue to undergo refinement and development and in so doing it is only natural that its use for some conditions shall be curtailed or replaced by newer and better methods of treatment. The good accruing to humanity through sound surgery is universally recognized. Yet it is this very enthusiasm for operative treatment that may occasionally lead us astray. Habit, even in medical practice, once well established, cuts such a convenient and comfortable groove that change becomes a painful and difficult process. Yet the wisdom of maintaining flexibility in medical practice is well recognized. Thus we no longer perform venotomy in order to bleed patients suffering from placenta previa, neither do we dehydrate the febrile indi-

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vidual. Yet these practices were once accepted as sound therapy.

But, to get back to the matter under discussion, those among you who have given thought to the problem may have pondered such things as:

1. The decreasing confidence shown by patients toward physicians, especially when operation is advised. This may be partly a manifestation of the American custom of "shopping around," but some of this change represents a break in patient-physician relationship.
2. Perhaps you have cogitated the increase of pelvic surgery as revealed in hospital listings despite chemotherapy, reduced birth trauma due to improved obstetrics, and vastly increased knowledge concerning functional changes in such organs as the ovaries and uterus.
3. If you were charged with the care of civilians, you may have tried to comprehend the capacity census for most hospitals during the trying war years, when operating schedules, which included pelvic operations, rose to a new high. Of course, this increase was partly due to insurance programs and to high wages rendering long-needed elective operations possible. But, these factors do not explain all the wartime increase.
4. Possibly in looking ahead you find cause for concern over the fact that we are today in the midst of the greatest educational program for the development of surgical residencies that our country has ever known. It would be a grave mistake if such educational facilities were not developed and made available to those willing and able to take advantage of such opportunities. Yet we would be remiss should we fail to recognize that the resulting abundance of surgical talent so created must also seek an outlet for its skill. In the careful screening of patients for conditions susceptible to surgery that is certain to follow, it is imperative that there be available reasonable agreement as to what constitutes surgical disease.

In speaking this way I am not expressing pessimism concerning the future. I am merely choosing this means of suggesting that it may be timely for a re-evaluation of some of our long-accepted indications for surgery of the female generative organs. To this end I should like to review certain data which appear to have an important bearing on the indications for pelvic surgery in the female.

Time and space do not permit consideration of such therapeutic colloquialisms as the arguments for and against the surgical correc-

tion of simple uterine retrodisplacement, repair of a healed laceration of the cervix, etc. Instead, I shall confine my further remarks to the ovary and uterus.

Following the first ovariectomy by Ephraim McDowell one hundred and twenty-four years ago (October, 1823), there gradually developed a conviction that much of women's trouble was due to malfunction of the ovaries which, of course, may actually have been the case. As a consequence it was only natural to assume further that oophorectomy offered a logical solution to these difficulties. The literature of the early twentieth century is studded with reports on ovarian extirpation. So widespread was the belief in this cause and effect relationship that countless thousands of normal ovaries were sacrificed upon the altar of science, and along with them, all too frequently, the health and perhaps happiness of accommodating patients. While we believe that we have advanced a long way in our scientific approach toward ovarian surgery since the turn of the century, the facts would seem to indicate that there still exists needless and abundant sacrifice of normal tissue.

In 1936 Carpenter¹ analyzed 1,137 separate gynecologic specimens from eleven general hospitals. He found the distribution of tissue to be as follows:

TABLE I

	<i>Per Cent</i>
Ovary	28.3
Tube	20.3
Uterus	19.1
Cervix	16.9
Endometrium	15.2

Changes noted in the 314 excised ovaries from these eleven general hospitals were classified as follows:

TABLE II

	<i>No. of Cases</i>	<i>Per Cent</i>
Follicle cyst	179	57.0
Simple cyst	36	11.1
Corpus luteum cyst	33	10.8
Chronic oophoritis	32	10.3
Hemorrhagic cyst	16	5.1
Pseudomucinous cystadenoma	3	1.0
Carcinoma	2	0.6
Krukenberg's tumor	2	0.6
Fibroma	2	0.6
Dermoid tumor	2	0.6
Granulosa tumor	1	0.3

Today we recognize that the normal functioning ovary varies in size. Probably this alteration in physiologic limits seldom exceeds 5 centimeters. These variations in size are evanescent, that is, they come and go. Persistent enlargement beyond 5 cm. generally implies significant pathology and, of course, may call for removal.

In 1937 Cooke² studied 1,378 ovarian cysts of less than 7.5 cm. in diameter (779 removed at operation, 599 clinically observed). He found that the majority were retention cysts and of no clinical significance. Cooke further noted that in most cases of simple cystic enlargement the tumescence disappeared within five months.

In a study of 934³ enlarged ovaries at the University of Michigan Hospital in 1942, we noted the following distribution according to size:

TABLE III

	<i>No. of Cases</i>	<i>Per Cent</i>
Small (up to 5 cm.).....	461	49.3
Medium (5 to 10 cm.).....	251	25.8
Large (over 10 cm.).....	222	24.0

Analysis of the 461 small ovarian tumors revealed the following:

TABLE IV

	<i>No. of Cases</i>	<i>Per Cent</i>
Simple cyst	447	96.9
Serous cystadenoma	4	0.8
Pseudomucinous cystadenoma	1	0.2
Parovarian tumor	1	0.2
Teratoma	2	0.2
Carcinoma	3	0.6
Functioning tumor (rare).....	3	0.6

Mengert⁴ records that during the years 1939-1943 inclusive, the department of pathology at one hospital examined 1,320 ovaries. Of these, 993 (practically 75 per cent) were normal or contained follicular or corpus luteum cysts.

The problem of ovarian conservation versus extirpation is important and deserves wide consideration. That universal comprehension does not exist regarding physiologic variation in ovarian size and the desirability of leaving normal ovarian tissue is reflected in the facts presented above and can be confirmed by pathologists everywhere, who daily report normal ovarian tissue removed at the time of pelvic surgery. On the basis of my own experience and that reported by others, there would seem to be little reason for oopho-

rectomy because of minor palpable cystic change. This attitude, of course, does not apply to ovaries showing progressive increase in size beyond 5 to 7.5 cm. nor to solid tumors of the ovary.

While it is true that we now have potent estrogenic substances available, it may be stated that helpful and useful as substitutional therapy may be, it is not yet a complete and perfect substitute for normal functioning ovarian tissue.

While oophorectomy may be simple from the standpoint of surgical technic, no surgeon is properly equipped to perform this operation until he has familiarized himself with knowledge concerning normal physiologic variations in size and the ovary's important hormonal function in maintaining normal health.

Removal of the right ovary at the time of appendectomy is proper if the ovary is diseased. However, all too frequently the cystic change noted falls within physiologic range and removal simply means the beginning of trouble. This seemingly desirable procedure makes disease of the remaining ovary a major problem. Judging by the number of women who have lost their right ovary, the left appears to be held in much higher esteem.

But the ovaries are not the only target organs in the pelvis subject to unnecessary extirpation. The uterus also suffers from surgical annihilation. Here again failure to comprehend the full physiologic function of the organ is a factor. In part this may be attributed to the fact that the physiologic importance of the uterus after the child-bearing years are over has not yet been convincingly demonstrated. There is, however, reason to believe that the uterus serves both as user and stimulator—a sort of an economic regulator as it were—of ovarian hormones at a time in life when the sap of youth is running low. Or, to state this in another way, premature removal of the normal uterus hastens atrophy and functional inactivity of the ovaries. Even though future study fails to prove such ovarian dependency upon uterine existence, excision of the uterus in the absence of disease cannot be justified any more than can removal of the normal breast.

I am aware of the fact that physicians do not always see eye to eye either in diagnosis or with respect to the indications for surgery. This may be a good thing and, like all controversy, can contribute toward progress. In recognizing the desirability of controversial opinion concerning the indications for hysterectomy, we must also concede that there exists no justification for removal of the normal healthy organ. This granted, let us review some facts and see what is happening today.

In a study⁵ of 246 hysterectomies performed during a period of four months in ten different hospitals in ten different communities in three Midwestern states, we discovered a none too happy picture—one that may hold true to an even greater or lesser extent in other sections of the country.

Table V shows the number of hysterectomies performed according to age period.

TABLE V
Number of Hysterectomies According to Age Period

<i>Age Period</i>	<i>Hysterectomies</i>	<i>Per Cent</i>
Under 20	1	0.4
20 to 29	30	12.1
30 to 39	78	31.7
40 to 49	108	43.9
50 to 59	22	8.9
60 to 69	6	2.8
70 to 79	1	0.4

As might be anticipated, almost one-half were performed between the ages of 40 and 49.

There were four deaths or a mortality rate of 1.6 per cent. This may be compared with a low of 0.6⁶ and a high of 4.6 per cent.⁷

Sixty-six per cent were subtotal, 29 per cent total, and 5 per cent vaginal hysterectomies. Since this represents the work of many surgeons, the preponderance of subtotal hysterectomies is interesting if not unexpected. In view of the propaganda favoring the total operation, one might have expected a higher incidence for the complete extirpation. Apparently surgeons are not yet familiar with the frequently voiced desirability of the total operation, or else they are not impressed by the evidence so far presented. If the latter is the explanation, then I find it readily understandable. For, taking everything into consideration, the total operation is more difficult than the subtotal, opinions to the contrary notwithstanding. Furthermore, except for the obvious fact that future disease of the cervix is eliminated, the other advantages sometimes claimed for complete hysterectomy still remain to be proved. When hysterectomy is necessary, I prefer the total operation for the specific and obvious advantage mentioned above. However, I am quite unimpressed by the evidence presuming to prove a lower mortality and morbidity for the total operation. Until thoroughly comparable cases treated by both methods have been evaluated, the benefits of total over subtotal hysterectomy will remain a much discussed ques-

tion with a single positive advantage—elimination of the cervix in favor of the total procedure. While this advantage seems real and sufficient enough to many of us, I question whether it justifies the potential added risk to the patient entailed by forcing total hysterectomy upon the occasional operator.

The symptoms leading to surgical care are shown in Table VI. It will be seen that bleeding heads the list. Other complaints included abdominal pain (9.7 per cent), pelvic pain (7.7 per cent), and backache (5.2 per cent). Almost 10 per cent (9.2 per cent) sought medical care for secondary symptoms. Under this heading are included fatigue, irritability, nervousness, and headache, complaints commonly listed as functional in character. Seventeen and four-tenths per cent had no complaints, an interesting observation, since most patients subjected to major surgery usually have a reason for seeking medical care. Doubtless this observation can be partly explained on the basis that routine pelvic examination revealed an asymptomatic condition for which operation was advisable.

The findings at the time of pelvic examination are shown in Table VII.

The significant observation that 18.6 per cent, almost one-fifth of the patients operated upon, were recorded as having no palpable disease may, in part, be explained on the basis that troublesome

TABLE VI
Complaints of Patients

<i>Symptoms</i>	<i>No. of Cases</i>	<i>Per Cent</i>
Bleeding	102	41.4
None given	43	17.4
Abdominal pain	24	9.7
Secondary { nervousness { headaches { etc.	23	9.3
Pelvic pain	19	7.7
Pelvic mass	17	6.9
Backache	13	5.2
Bearing down and/or prolapse	11	4.4
Dysmenorrhea	10	4.0
Leukorrhea	9	3.6
Abdominal mass	6	2.8

(Percentages are based on 246 cases. Some patients, however, complained of more than one symptom.)

TABLE VII

<i>Finding</i>	<i>No. of Cases</i>	<i>Per Cent</i>
Normal pelvis	46	18.6
Uterine fibroids	78	31.7
Enlarged uterus (fibrosis)	45	18.2
Pelvic inflammatory disease	17	6.9
Retrodisplacement	17	6.9
Relaxed pelvic floor	15	6.0
Prolapse	14	5.6
Cervix disease	13	5.2
Adhesions	13	5.2
Pelvic mass	12	4.8
Ovarian tumor	11	4.4
Carcinoma of corpus luteum	4	1.6
Polyps	2	0.8
Carcinoma of cervix	1	0.4
Pregnancy	1	0.4
Ectopic pregnancy	1	0.4
Bowel obstruction	1	0.4
Endometriosis	1	0.4
Degenerated area in uterus	1	0.4

(Percentages are based on 246 cases. Some, however, had more than one diagnosis on pelvic examination.)

symptoms such as hypermenorrhea and polymenorrhea existed without palpable disease. Even so, this figure seems high.

The figure 31.7 per cent for uterine fibroids is somewhat deceptive since many clinically suspected fibroids were later found to be either nonexistent or else extremely small.

The pathologist's findings are summarized in Table VIII.

TABLE VIII

<i>Pathology</i>	<i>No. of Cases</i>	<i>Per Cent</i>
Fibroids	107	43.4
No pathology (or relaxation)	76	30.8
Endometrial hyperplasia	40	16.2
Salpingitis	32	13.0
Adenomyosis	23	9.3
Cervicitis	19	7.7
Polyps	16	6.5
Carcinoma (uterus or ovary)	13	5.2
Benign ovarian tumors	7	2.8
Endometriosis	7	2.8
Pregnancy (or retained products)	7	2.8
Myometrial hyperplasia	6	2.4
Fibrosis uteri	6	2.4
Prolapse	4	1.6

(Percentages are based on 246 cases, but in many instances more than one diagnosis was made.)

It is startling to note that in 76, or 30.8 per cent, the extirpated organs revealed no microscopic evidence of disease. The figure is especially revealing since included as acceptable pathology are disease of the adnexa, prolapse, hyperplasia of the endometrium, and pelvic relaxation. The facts that 17.4 per cent of the patients presented no symptoms and 18.6 per cent had no palpable pelvic disease do not of themselves warrant the assumption that almost one-fifth of the patients in this particular series had *acute remunerative* or *hip pocket* hysterectomies. However, the discovery that 30.8 per cent were found to have no disease in the organs removed is not readily accounted for. Further correlation showed that 41 or 16.6 per cent had neither symptoms, palpable pelvic disease, nor histopathology of the removed organs. Table IX summarizes the correlation between clinician's diagnosis and pathologist's findings.

TABLE IX

	No. of Cases	Per Cent
Clinical diagnosis confirmed by pathologist.....	122	49.6
Clinical diagnosis not confirmed, but operation justified	43	17.4
		67.0
No histopathology (or relaxation).....	76	30.8
Diagnosis a contraindication to operation.....	5	2.0
		32.8

In 49.6 per cent of patients the clinical diagnosis was confirmed. In 17.4 per cent the clinical diagnosis was not corroborated, but the operation nevertheless was considered justifiable. In 32.8 per cent there was either no disease or else disease contraindicating hysterectomy.

In evaluating these figures it must be remembered that errors in diagnosis are bound to occur. No physician is so good as never to make a mistake. But even with the very liberal allowances permitted by this study, we find almost one third of the extirpated organs free from evidence of disease. If this trend is borne out by further study, then it is time that we scrutinize commonly accepted indications for pelvic operations, especially oophorectomy and/or hysterectomy.

Some hospitals have already taken steps to effect improvement through the formation of tissue study committees. In others, pre-operative consultation is required. Doubtless both measures will serve to reduce nonindicated surgery, but at the same time both border on regimentation and appear to be poor substitutes for uni-

versal acceptance of sound surgery based on careful preoperative study and diagnosis.

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HIDRADENOMAS OF THE VULVA

Report of Four Cases with an Evaluation of Them in the Light of Analogous Breast Lesions.

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and

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SWEAT gland tumors of the vulva are scarcely mentioned in the standard textbooks of pathology, gynecology, and surgery. This is not strange since they are comparatively rare lesions. When encountered, however, they present serious diagnostic and prognostic problems, and for this reason a closer study of them seems indicated.

The first description of a tumor of this type was made in 1878 by Werth.¹ It remained for Pick² in 1904 to appreciate the true nature of this lesion and to coin the term "hidradenoma." To date there are approximately 80 recorded cases, and only recently have reports appeared in the English literature. Despite this paucity of reported cases, these tumors are the most common tumors encountered in the vulva. This is substantiated in our own experience. During a four year period we found in our files 5 vulval tumors, 4 of which were of sweat gland origin; the fifth was a malignant melanoma.

McDonald, Lovelady and Waugh³ found 64 vulval tumors in the Mayo Clinic files over a 33 year period, from 1906 to 1939. These were classified as follows:

- 32 adenocarcinomas of apocrine sweat gland origin
- 16 fibromas
- 7 lipomas
- 5 hemangiomas
- 2 leiomyomas
- 1 ganglioneuroma
- 1 lymphangioma

The age of the patients varied, with the highest incidence between 40 and 50 years. The youngest reported was 22 years old, the oldest 62. Not a single case has been reported prior to puberty.

The distribution of the tumors in a series reported by Rothman⁴ was as follows:

- 32 on the labium majus
- 7 on the labium minus
- 3 between the labia

2 in the posterior commissure

The tumors measure from 3 mm. to 5 cm. in diameter. When small, they are usually situated subjacent to the epidermis and present as small cystic, elevated nodules. With an increase in size, the overlying epidermis may be thinned and ulcerate, with eventration of the papillary contents of the cysts. These are the tumors which present as fungoid or filiform, reddish masses. Some of the cysts contain clear fluid; others, desquamated epithelial debris.

Microscopically, the picture is usually that of an intracystic papillary tumor. The papillary processes are lacy or filiform and covered by double-layered epithelium. Twenty-five per cent show scattered glands which resemble sweat glands and are lined by columnar acidophilic epithelial cells.

Usually the tumors are discovered as an incidental finding during routine physical examination and present no symptoms. Occasionally the patient notes a mass or complains of spotting of the undergarments by blood or secretion.

The question of malignancy is a difficult one. As a rule, however, these lesions are clinically benign. Only 3 of the 80 cases recorded have shown frank malignant characteristics. One of them,³ a 22 year old girl, had extension to the inguinal nodes and died 4 months after operation. The second case had a recurrence after 7 years but was cured by re-operation. The third case⁵ had a metastasis to an inguinal node but remained well for two years after vulvectomy and groin dissection.

It is our feeling that these lesions are analogous to the intraductal tumors of the breast and that their evaluation should reflect our experience with the latter tumors. The basis for this belief rests upon embryologic considerations, parallelism of clinical behavior, and the striking morphologic similarity of the lesions. To elaborate, it is well known that in the fetus a milk line develops which extends from the axilla to the groin. This is a manifestation of our phylogenetic evolution, and in our mammalian relatives, breasts develop all along this line; for example, in the dolphin and lemur, breasts are situated in the vulva. In man, all but the pectoral mammae regress, except for those interesting cases of atavistic persistence of supernumerary breasts.

Appreciation of this developmental fact explains those cases of lactating breast tissue in the vulva, fibroadenomas of the vulva,⁶ vulval breast carcinoma,⁷ and vulval Paget's disease.⁸

Histologic examination of the milk line shows that along it there

is a massing of sweat glands. The apocrine sweat glands persist in the axilla and vulva, and it is generally conceded that they become modified in the mammary region to form the parenchymatous portion of the breast.

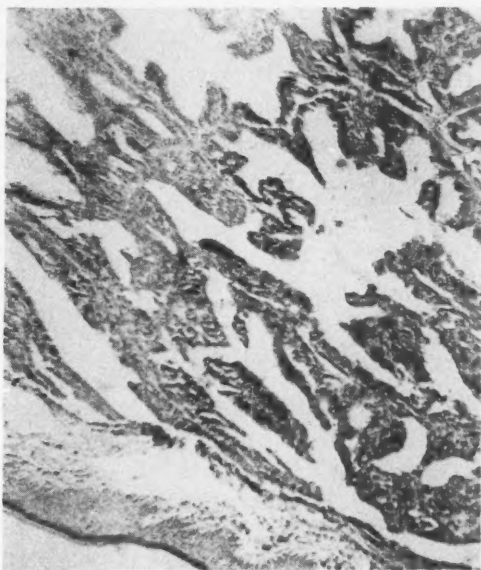


Fig. 1. Case 2. Low power photomicrograph showing the typical location and intracystic papillary nature of the tumor.

There are other indications of the close relationship of structures along the milk line, and these relate to function; for example, the breast and vulva enlarge noticeably at puberty, apparently under the stimulus of sex hormone change. This is interesting in view of the fact that the apocrine sweat glands in the lower animals are known to play a definite role in sex function.

The clinical behavior of the vulval hidradenomas and the intra-ductal papillomas of the breast shows a striking parallelism. Both tumors are relatively benign and slow-growing, but on occasion may show malignant characteristics. Both of them may exist for long periods of time without producing symptoms, or may produce a slight discharge which may or may not be bloody, depending on local conditions. Local excision usually results in a cure, but in the vulva and breast the prognosis depends largely upon the histology of the tumor and to some extent on its duration.

There is a very striking morphologic similarity between the two

tumors. The usual cystic vulval hidradenoma is indistinguishable from the benign intraductal breast papilloma. Both of them are papillary tumors growing into a lumen. The lining epithelium is double-layered, and in approximately 25 per cent of the cases both

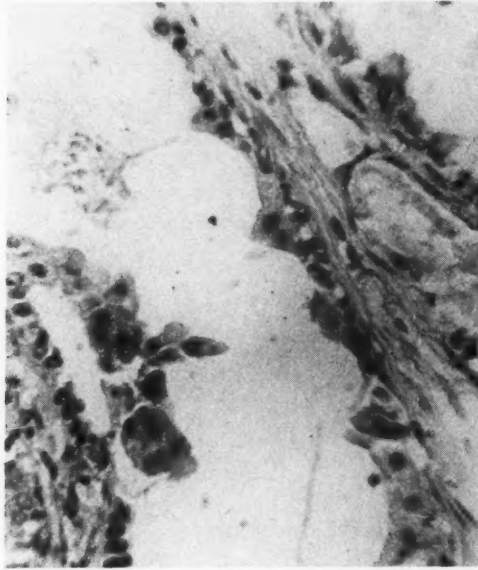


Fig. 2. Case 2. High power photomicrograph of a gland space lined by low columnar acidophilic "sweat-gland-like" epithelium. These same cells are frequently encountered in the breast.

tumors show glands lined by light acidophilic cells with small nuclei which strikingly resemble the apocrine sweat glands. The more malignant varieties of the vulval hidradenomas are in a remarkable fashion the intraductal papillary adenocarcinomas of the breast. It should also be pointed out that cylindromatous types of sweat gland tumors occur in both vulva and breast. Previous writers have noted the similarity between the two types of tumors, and the study of our cases bears out this observation.

From the speculative viewpoint, the recognition of the connection between these tumors carries certain implications. It would seem that the presence of vulval hidradenomas should at least point the finger of suspicion to the breast as a possible concurrent site of a similar tumor. There is no support for this hypothesis in our cases, and in the literature only one case was found in which a breast carcinoma developed two years after excision of a vulval hidradenoma.

The sequence of events in this particular case was probably pure coincidence, but in view of what we have already discussed it is at least thought-provoking.



Fig. 3. Case 1. Tubular acinar type of gland formation. This is an example of epidermal ulceration with eventration. Mitoses are very numerous.

CASE REPORTS

CASE 1. Mrs. J. B. J., white female, aged 56, was first seen by a urologist on June 10, 1943, because of a mild cystitis. During the examination, a red papillary mass was noted on the right labium minus. The patient was then referred to another surgeon and a local excision was done. On being questioned, the patient stated that she had noticed this mass for several months, that it was completely painless, and her only complaint was occasional slight spotting of her undergarments.

Pathologic report: Gross specimen consists of a pink, polypoid structure, 2.5 cm. in length, 1 cm. in width and thickness. This is slightly granular, and on one edge there is a white, horn-like protuberance, 3 mm. in length, which suggests avulsed skin. On the opposite end there is also a thin margin of normal skin. The tumor is attached to a pedicle and seems to arise just beneath the epidermis.

Microscopic examination shows a tumor, the structure of which is papillary and consists in essentials of tubular acinar glands. In some places these glands are lined by double layers of epithelium. In other areas there seems to be a single layer with pseudostratification of the nuclei. The individual cells are slightly acidophilic and have an elongated, chromatin-rich nucleus with a small

nucleolus. Mitoses are very numerous and there is some pleomorphism of the individual cells.

Diagnosis: Papillary hidradenocarcinoma, Grade II.

This patient was followed and was last seen on Feb. 22, 1947, at which time she was well, without evidence of recurrence or extension.



Fig. 4. Case 4. A more glandular type of intracystic hidradenoma.

CASE 2. Miss A. C., white female, was seen on March 8, 1944, by a dermatologist because she had noted a small mass on her right labium minus. This was excised and sent to the laboratory for examination.

Pathologic report: Specimen consists of a small, almost round flap of tissue which measures 5 by 4 by 5 mm. This is covered on one surface by grayish-white epithelium, and there is a small elevated nodule in the center with slight thinning of the skin above it. On section, the nodule is found to arise just below the epidermis, to be encapsulated in cyst fashion, with a central portion filled with grayish-white, soft tissue. Microscopic examination shows the surface to be intact. Just beneath this there is a cystic structure lined by an outer layer of flattened epithelium and an inner layer of columnar cells. Projecting from the cyst wall are fingerlike papillary excrescences covered by the same type of epithelium. In one portion of the specimen there is a gland space lined by larger, pale, acidophilic cells with small, chromatin-rich, basally situated nuclei. This particular area recalls similar structures found in the breast, usually considered of apocrine sweat gland origin.

Diagnosis: Intracystic papillary hidradenoma.

We have been unable to locate this patient in our follow-up study.

CASE 3. Miss L. B., white female, age 30, was first seen by the referring gynecologist on April 3, 1944, because of a congenital dystrophy of the bladder. During the examination, several small tumor masses were noted on each labium minus. These averaged 1.5 cm. in diameter and were red, nodular, and slightly granular. A biopsy was taken from one of these nodules on the right labium on two separate occasions.



Fig. 5. Case 4. High power photomicrograph showing the glandular pattern of the intracystic projections.

Pathologic report: Specimen consists of a tab of tissue, 5 by 5 by 5 mm. This is covered by grayish-white skin. Beneath this the tissue appears soft and somewhat edematous.

Microscopic examination shows papillary tumor situated subjacent to the epidermis. This is made up of glands lined by a double layer of epithelium. The individual cells show slightly acidophilic cytoplasm and cigar-shaped nuclei. In some places the cells are columnar, the nuclei pseudostratified. The surface epithelium is ulcerated and there is extensive acute infection. There are occasional mitoses.

Diagnosis: Papillary hidradenoma.

This patient was sent to the hospital but left against advice and refused further treatment. We have been unable to locate her for a follow-up study.

CASE 4. Mrs. W. W. B., white female, age 49, was first seen by a gynecologist on July 24, 1945, with a chief complaint that she had noticed a small mass on her right labium majus. This was situated in the midportion on the medial aspect.

Pathologic report: Specimen consists of a small piece of tissue, 8 by 8 by 6 mm. The surface of this is covered by a grayish-white epithelium, and in the center there is a small dimpled area. On section, beneath the epithelium there is a cystic structure, 5 mm. in diameter, filled in part by a papillary tumor mass, and containing a small amount of grayish-white, semi-solid debris.

Microscopic examination reveals a cystic tumor just beneath the skin. The center of the cyst is partially filled by numerous fingerlike papillary projections. These projections are covered by a double layer of epithelium which in some places consists of cuboidal epithelium. These papillary projections are supported by a vascular fibrous tissue framework. The lining of the cyst is also made up of a double layer of epithelial cells.

Diagnosis: Intracystic papillary hidradenoma.

This patient is still alive and well, with no evidence of recurrence or extension.

SUMMARY

Four vulval sweat gland tumors are reported with special reference to their similarity clinically and histologically to the intraductal papillary tumors of the breast. The analogy between the breast and vulva is drawn—based on their similar embryologic origin.

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MEDICAL COLLEGE PARTICIPATION EXPANDED

The January 1947 number of the Southern Surgeon carried on page 42 an announcement that at least two entire issues each year would be devoted to the medical department of a medical college in the Southeast. Since that announcement was made the Executive Council of The Southeastern Surgical Congress has decided to broaden this program and extend an invitation to *other medical colleges in the South* to participate.

It has been stated on the announcement page since 1932, the year The Southern Surgeon was founded, that this journal is devoted to "the advancement of surgery particularly in the South"—that "it aspires to encourage surgeons in the Southern States, especially the younger surgeons, to record their own observations and original work."

During the intervening years it has published the papers presented before the Postgraduate Assemblies of The Southeastern Surgical Congress, as well as from other sources. The February and August issues of this year were devoted to the Medical College of Alabama and to the University of Tennessee respectively, all material being drawn from the surgical staffs of these schools. The large number of papers from the University of Tennessee made it necessary to devote both the August and the September issues to that university.

In 1948 the February issue is to be dedicated to Emory University and the August issue to Tulane University.

The University of Virginia has been assigned one issue in 1949 and another given to Baylor University.

The enthusiasm with which this project has been received by the participating staffs of these medical colleges would indicate that the experiment has been successful and highly productive of a great many excellent surgical papers which otherwise would never have appeared in the literature.

Very shortly we hope to announce the appointment of an editor who will be in a position to work more closely with the medical colleges.

Urology Award—The American Urological Association offers an annual award of \$1,000.00 (first prize of \$500.00, second prize \$300.00 and third prize \$200.00) for essays on the result of some clinical or laboratory research in Urology. Competition shall be limited to urologists who have been in such specific practice for not more than five years and to residents in urology in recognized hospitals.

The first prize essay will appear on the program of the forthcoming meeting of the American Urological Association, to be held at the Hotel Statler, Boston, Massachusetts, May 17-20, 1948.

For full particulars, write the Secretary, Dr. Thomas D. Moore, 899 Madison Avenue, Memphis, Tennessee. Essays must be in his hands before March 1, 1948.

